AMENDMENTS TO THE SPECIFICATION

In the Specification

Please amend the title, subtitle and paragraph extending from page 1, line 5 to line 13 as follows:

BACKGROUND ~~OF THE INVENTION~~

-- **Field of the ~~Invention~~ Disclosure**

~~The present invention relates to a~~ A method of forming a barrier metal in a semiconductor device~~, and more particularly, to a method of forming a barrier metal in a semiconductor device~~ is disclosed that is capable of preventing introduction of a conductive material into a base layer by a subsequent process, by forming the barrier metal after pores existing on the surface of an interlayer insulating film being a porous film are buried. --

Please amend the paragraph extending from page 2, line 6 to page 3 line 3 as follows:

-- The porous film can improve a low dielectric constant characteristic by controlling the ratio of the pore within the film. This porous material is made by a method by which air bubbles of a small size are formed within the film in the course of curing a precursor of a solid state or a weak coupling between TEOS particles being the precursor, and a solvent is abruptly volatilized to keep the porous structure intact. In this process, silica mesh count within the porous material and the pore structure are changed depending on a drying method of the solvent. If the solvent is volatilized by an annealing process like the curing of the SOG film, a material having a dense structure is formed while the porous material shrunk, so that it does not have a desired characteristic of the porous film having a low dielectric constant. Therefore, the porous material is formed by means of a supercritical drying method of abruptly volatilizing the solvent in a condition of over a triple point in the solvent. Another method includes making precocious the solvent as a special solvent at the normal pressure to form the porous material. As the pore has a dielectric constant of 1 in the air, it is required that the ratio of the pore be increased or the dielectric characteristic of silica be lowered in order to form a film of a low dielectric constant. In case of the former, however, if the ratio of the pore is increased, mechanical stability is

lowered since a structural strength of the film is weaken. For this reason, there is a problem that the low dielectric constant film could not hold the weight when a subsequent CMP process, etc. implemented. --

Please amend the heading and paragraphs extending from Page 3, line 20 to the end of Page 4 as follows:

SUMMARY OF THE ~~INVENTION~~ DISCLOSURE

Accordingly, ~~the present invention is contrived to substantially obviate one or more problems due to limitations and disadvantages of the related art, and an object of the present invention is to provide~~ a method of forming a barrier metal in a semiconductor device is disclosed that is capable of preventing introduction of a conductive material into a base layer in a subsequent process, by burying pores existing on the surface of an interlayer insulating film being a porous film and then forming the barrier metal.

Additional advantages~~, objects,~~ and features of the ~~invention~~ disclosed techniques will be set forth in part in the description which follows and in part will become apparent to those having ordinary skill in the art upon examination of the following or may be learned from practice of the invention. The ~~objectives and other~~ advantages of the ~~invention~~ disclosed techniques may be realized and attained by the structure particularly pointed out in the written description and claims hereof as well as the appended drawings.

To achieve these ~~objects and other~~ advantages ~~and in accordance with the purpose of the invention~~, as embodied and broadly described herein, a method of forming a barrier metal in a semiconductor device according to the present invention is characterized in that it comprises ~~the steps of~~ a) patterning a porous film on a base layer to form a via hole, b) depositing a CVD TiN film on the entire structure including the via hole, c) implementing a plasma treatment process

using $N_2 + H_2$, d) repeatedly implementing the steps (b) and (c) in order to bury only the pores formed on the surface of the porous film with CVD TiN, and e) forming a barrier metal on the entire structure including the via hole.

~~In another aspect of the present invention, it~~ It is to be understood that both the foregoing general description and the following detailed description of the ~~present invention~~ disclosed techniques are exemplary and explanatory and are intended to provide further explanation of the ~~invention~~ disclosed techniques as claimed. --

Please amend the paragraph appearing on Page 5, lines 3 to 6 as follows:

-- The above and other ~~objects,~~ features and advantages of the ~~present invention~~ disclosed methods will be apparent from the following detailed description of the preferred embodiments ~~of the invention~~ in conjunction with the accompanying drawings, in which: --

Please amend the paragraph appearing on page 5, lines 9-11 as follows:

-- FIG. 2A through FIG. 2D are cross-sectional views of semiconductor device for explaining a disclosed method of forming a barrier metal in the device according to a preferred embodiment ~~of the present invention~~. --

Please cancel the paragraph appearing on Page 5, lines 14-17.

Please amend the paragraphs extending from Page 6, line 6 to Page 7, line 7 as follows:

-- Next, a plasma treatment process is implemented using $N_2 + H_2$ gas. C, O, S, etc. within the CVD TiN film **200** are coupled with hydrogen by this plasma treatment and are then pumped out. The thickness of the CVD TiN film **200** is also reduced. Accordingly, the pores on the surface of the porous film **203** ~~is~~ are gradually buried with CVD TiN.

Deposition of CVD TiN and the subsequent plasma treatment are repeatedly implemented so that only the exposed pores **206** (FIG. 2A) on the sidewalls of the via hole **100** are completely buried by adequately controlling the thickness of CVD TiN and a plasma treatment time, as shown by the buried or filled pores **209** in FIG. 2C.

Turning to FIG. 2D, a barrier metal **210** and a seed metal **211** are deposited on the entire structure including the via hole **100**. A conductive material **212** such as copper (Cu) is then buried.

As the pores **206** formed on the sidewall surface of the porous film that define the via hole **100** are removed by the above process by creating filled or buried pores **209**, ~~a~~ the unwanted phenomenon ~~that the~~ of conductive material ~~is~~ being introduced into the underlying structure through the pores **206** ~~could be eliminated~~ is avoided by creating the filled or buried pores **209** thereby acting to block migration of the conductive material into the porous material **203** and later into the base layer **201**.

As described above, ~~according to the present invention,~~ after the pores **206** existing on the surface of the interlayer insulating film being the porous film **203** are buried to form the structures shown at **209**, the barrier metal **210** is formed. Therefore, the ~~present invention~~

disclosed methods ~~has~~ have a new effect that it can prevent introduction of the conductive material into the base layer in a subsequent process.

The forgoing embodiments are merely exemplary and are not to be construed as limiting this disclosure ~~the present invention~~. The present teachings can be readily applied to other types of apparatuses. ~~The~~ This description ~~of the present invention~~ is intended to be illustrative, and not to limit the scope of the claims. Many alternatives, modifications, and variations will be apparent to those skilled in the art. --